# Cygnus X Bore Up Kit (155.6 cc) Instruction Manual

Item No. : 01-05-4460 (Without cam)
: 01-05-4461 (Cam included)
Applicable to : Cygnus X (XC125)

Thank you for purchasing one of our TAKEGAWA's products. Please strictly follow the following instructions in installing and using the products. Before fitting the products, please be sure to check the contents of the kit. Should you have any questions about the products, please kindly contact your dealer.

## Features

- This is a bore up kit comprising of a cylinder and a piston, utilizing a stock cylinder head.
- This increases bore diameter from 52.4mm to 58.5, and engine displacement from 124 cc to 155, and compression ratio from 9.5:1 to about 11.4:1.
- The aluminum bore surface of the cylinder included in this kit is ceramic-coated. This keeps back the seizing and improves sliding.

## Please read the following instructions before installation.

### ! Caution about fuel to use !

This product is so designed to achieve a higher compression ratio than stock engines. As for the fuel, high-octane gasoline should always be used. In case regular gasoline is used, abnormal combusiton takes place, and the engine cannot achieve its original performance. Moreover, it is highly likely that the piston will break down, leading to serious failure of the vehicle. Before installing, make sure that no regular gasoline remains in the fuel tank. In case regular gasoline is remaining in the fuel tank, do replace it with high-octane gasoline.

### ! Caution about spark plug !

Be sure to replace a spark plug with a hot-type spark plug CR8E (NGK) with high thermal value, or a hotter-type one. Subsequently, choose and use a right spark plug with the right level, depending on the degree of burning of the spark plug electrode section.

◎ We do not take any responsibility for any accident or damage whatsoever arising from the use of the products not in conformity with the instructions in the manual.
◎ We shall be held free from any responsibility or compensation whatsoever for any glitch in parts other than ours if the glitch takes place after installation and use of this product.
◎ If you make alterations to the products, we shall be held free from any guarantee of them.
◎ You are kindly requested not to contact us about the combination of our products with other manufacturers'.
◎ This kit is designed for exclusive use in the above-mentioned type of motorcycle only. (and frame number) Please take note that this product cannot be mounted on other types of motorcycles.
◎ Fix this product correctly, referring to a right YAMAHA genuine parts service manual for your vehicle.
◎ Before installation, prepare right tools and perform the work, strictly following the installation procedure with great care. Besides, this instruction manual, as well as a YAMAHA genuine parts service manual, is written with those persons in mind who have basic skills and knowledge in tuning. Therefore, we recommend those who are technichally inexperienced or do not have enough tools to ask a technically-reliable specialist shop for the work.
◎ Clearance between a piston and a cylinder is designed to be narrow. Therefore, never forget to do shakedown.
◎ Because of its high compression ratio and improved airtightness, you will have to press down hard on the kick pedal when kick starting. Further, it may be some times difficult to start with a self-starter even when the battery is fully charged.
◎ The installaiton of this product increases the heat release value of the engine, caused by the increase in power. Therefore, this kit is inadequate for the long-time high-load driving.
◎ Some of bolts, nuts, dowel pins and packing will be reused. However, be sure to replace worn-down or severely-damaged ones with new ones.

**⚠ CAUTION** The following show the envisioned possibility of injuries to human bodies and property loss as a result of disregarding the following cautions.

- Work only when the engine and the muffler are cool. (Otherwise, you will burn yourself.)
- Prepare right tools for the work, and do the work in the proper and right way. (Otherwise, improper work could cause breakage of parts or injuries to yourself.)
- Always use a torque wrench to screw bolts and nuts tight and securely to the specified torque. (Improper torque could cause these parts to get damaged or fall off.)
- As some products and frames have sharp-pointed or protruding portions, please work with your hands protected. (Otherwise, you will suffer injuries.)
- Before riding, always check every section for slack in parts like screws. If you find slack ones, screw them securely up to the specified torque. (Or improper torque may cause parts to come off.)

**⚠ WARNING** The following show the envisioned possibility of human death or serious injuries to human bodies as a result of disregarding the following cautions.

- Always drive the engine in a well-ventilated place, and do not switch on the engine in an airtight place. (Otherwise, you will suffer from carbon monoxide poisoning. )
- When you notice something abnormal with your motorcycle while riding down a road, stop riding immediately and park your motorcyle in a safe place. (Otherwise, the abnormaility could lead to an accident.)
- Before doing work, place the motorcycle on level ground to stablize the position of your motorcycle for safety's sake. (Otherwise, your motorcycle could fall down and injure you while you are working.)
- Check or perform maintenance of parts correctly according to the procedures in the instruction manual or a service manual. (Improper checking or maintence could lead to an accident.)
- If you find damaged parts when checking and performing maintenance of your motorcycle, do not use these parts any longer, and replace them with new ones. (The continued use of these damaged parts as they are could lead to an accident.)


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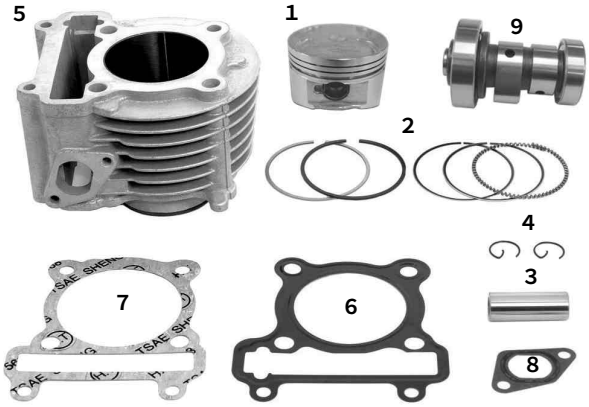
◎ Please be informed that, mainly because of improvement in performance, design changes, and cost increase, product specifications and prices are subject to change without prior notice.
◎ A defective product which we acknowledge is caused by product materials or defect in manufacturing will be repaired or replaced with a new one by us at our expense, if and when a claim is filed with us within one (1) month of your purchase. However, replacing of parts shall be made at users' expenses. And we shall be held free from responsibility for any defect caused by improper installation or use.
◎ You are requested to keep this instruction manual until you discard this product.

# ～Kit Contents～




| No. | Parts Name | Qty |
|---|---|---|
| 1 | Piston | 1 |
| 2 | Piston ring set | 1 |
| 3 | Wrist pin | 1 |
| 4 | Wrist pin circlips | 2 |
| 5 | Cylinder | 1 |
| 6 | Cylinder head gasket | 1 |
| 7 | Cylinder gasket | 1 |
| 8 | Tenstioner lifter gasket | 1 |
| ※9 | Camshaft | 1 |

※ A camshaft is not included in Item No. of 01-05-4460.

# ～Installation Procedures～

◇ Before doing work, place the motorcycle on level ground to stablize the position of your motorcycle. As to the following procedures, work only when the engine and the muffler are cool. (Otherwise, you will burn yourself.)

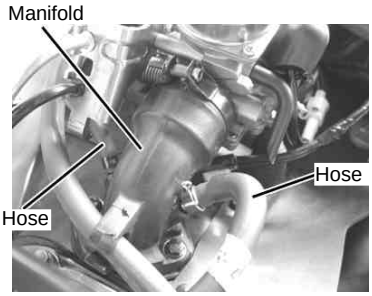
## ●Parts Removal

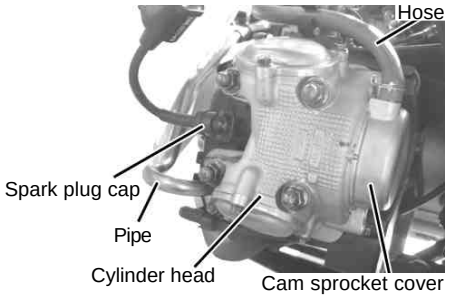
### 1. Body Cover

◇ With reference to YAMAHA genuine parts service manual, remove following parts.
- Front cover
- Fuel-pump-mounting bolts
- Seat / trunk
- Seat lock
- Standing handle
- Left / Right side covers
- Tail light unit
- Left / Right side mauls
- Under cowl
- Foot rest board

### 2. Junctions

◇ With reference to YAMAHA genuine parts service manual, disconnect the following parts.
- Negative pressure hose on the manifold
- Spark plug cap
- Blow-by gas hose on the cam sprocket cover
- Secondary air supply pipe on the cylinder head




## ●Carburetor Removal

◇ Loosen the carburetor clamp on the manifold, and disconnect the carburetor.

## ●Exhaust Pipe Removal

◇ Remove two nuts on the cylinder head.
◇ Remove bolts on a rear arm, and remove an exhaust pipe.

## ●Air Shroud Removal

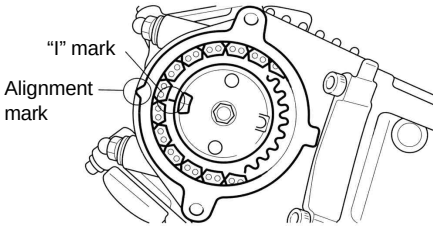
◇ Remove pan screws and tapping screws, and remove a fan air shroud.
◇ Remove tapping screws, divide right and left side cylinder air shrouds, and remove them.

## ●Spark Plug Removal

◇ Remove a spark plug.

## ●Cam Sprocket Removal

◇ Remove a cam sprocket cover and O-ring.
◇ Rotate a flywheel clockwise, and align an "I" mark on the cam sprocket with an "△"mark on the cylinder head. This position is at what is called TDC (Top Dead Center) on the compression stroke.




◇ Holding the flywheel, loosen a cam sprocket bolt. Remove a cap bolt of the cam chain tensioner and take out a spring.
◇ Unfasten the cam sprocket bolts and remove breather plate and cam sprocket.
◇ Remove bolts and the cam chain tensioner frm the cylinder.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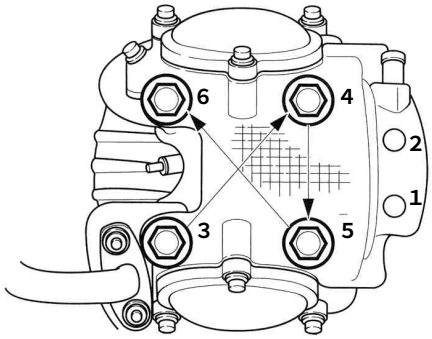
## ●Removal of Cylinder Head, Cylinder, and Piston

◇Loosen the nuts / washers and bolts on the cylinder head in a few steps in the following order as shown in the figure below.




◇Remove two dowel pins and a cam chain guide. If you find no wear or damage upon checking, reuse them.

◇Remove the cylider and two dowel pins. If you find no wear or damage upon checking, reuse them.

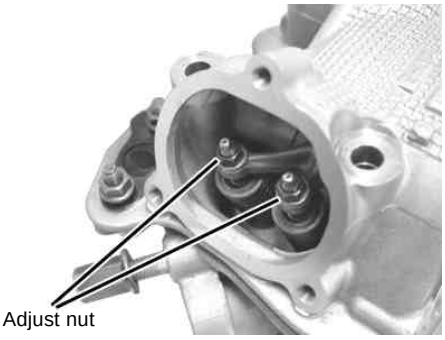
◇Remove wrist pin circlips, pull out a wrist pin, and remove the piston.

※Plug the opening on the crank case with a waste cloth not to get any foreign material in it.

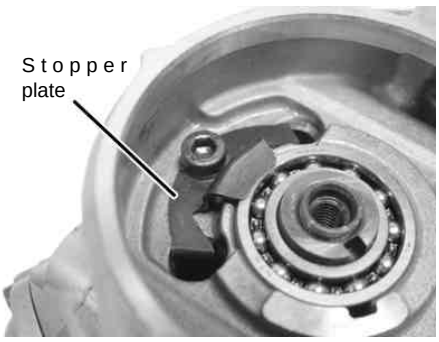
◇Completely get rid of the gasket scraps remaining on the mating surface to the cylinder with a scraper or the like.

## ●Change of camshaft (in the case of a cam being provided.)

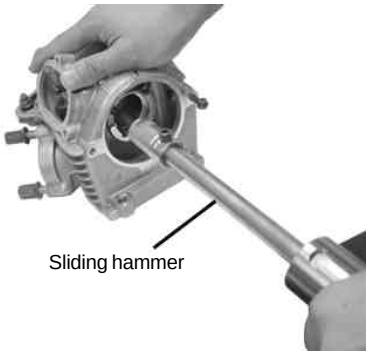
◇Remove a tappet cover and O-ring both for intake and exhaust, and loosen the adjust nut and adjust screw on the rocker arm.




◇Remove the bolt and stopper plate.




◇Detach the rocker arm shafts both on intake and exhaust sides with a sliding hammer.
Special tool to use: Sliding hammer
Yamaha-made genuine tools:
- Balancer shaft puller bolt: (90890-01085)
- Weight: (90890-01084)




◇Attach a bolt of the cam sprocket to the camshaft, and pull out the camshaft from the cylinder head.

※ Never pull it out forcibly.

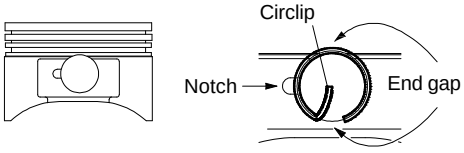
◇Apply engine oil to the cam on the provided camshaft and to the bearing, and install the bolt, and install the camshaft to the cylider head.

◇Turn the cam toward the combustion chamber, and install the rocker arm and stopper plate.

## ● Piston Installation

◇Install a wrist pin circlip to one of the pin holes on the piston.

※Attach the piston pin circlip so the ring end gap does not meet with the notch on the piston pin hole, and ring end gap should be either on the top or at the bottom of the hole as illustrated in the figure below.

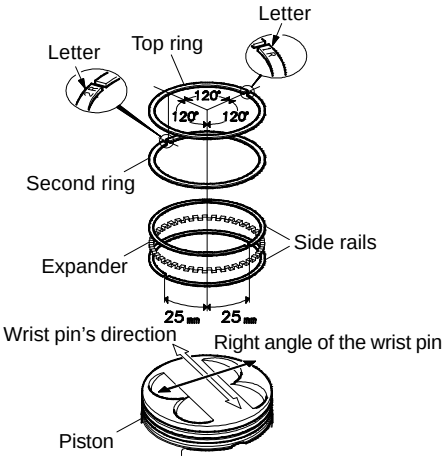



◇Fix piston rings to the piston. Letters “1R” and “2R” are engraved on the top and second rings respectively. Be sure to fix the rings so the sides with the engraves letters face upwards.

※Be careful not to damage the piston or break the rings.

◇Apply engine oil to kit’s wrist pins, pin hole on the piston, and to an end on a connecting rod. Fix the piston to the connecting rod with the arrow on the top of the piston facing the exhaust side, and then fix the wrist pin circlips included in the kit.

◇Apply engine oil to the piston rings, and make sure than the rings turn smoothly.




## ●Cylinder Installation

◇Remove the waste cloth plugged in the opening.

◇Check, through the cam chain hole, whether the cam chain has not come off the sprocket on the crank shaft.

◇Degrease the mating surfaces of the crank case and the cylinder with thinner or the like, and fix dowel pins and cylinder gasket included in the kit.

◇Fit the cylinder into the piston little by little with fingers, being careful not to shift the piston ring’s end gaps out of the position, and then fit the cylinder into the crank case.

※When the piston is fitted into the cylinder, pass the cam chain through the cylinder.

◇Degrease the upper surface of the cylinder, and fix two dowel pins and a kit’s cylinder head gasket. Fit the cam chain guide precisely to the groove on the cylinder.

## ●Cylinder Head Installation

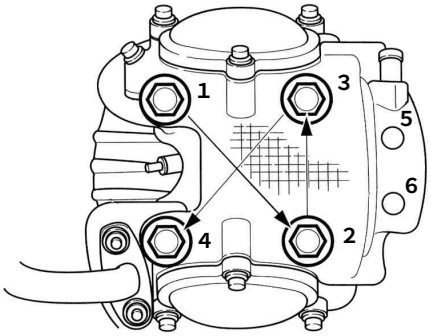
◇Degrease the mating surface of the cylinder head with thinner or the like. Pass the cam chain through the cylinder head and install the cylinder head.

Loosely tighten four washers / nuts and two bolts to the stud bolts. Tighten nuts to the specified torque in several speps in order of the numbers in the figure below.

Specified torque

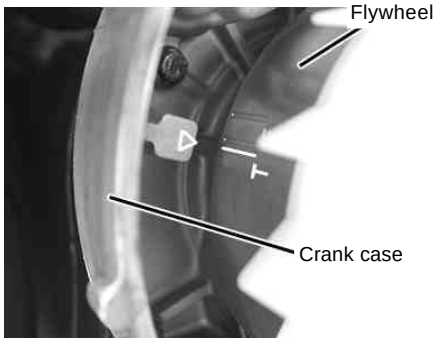
**Cylinder head nut : 22 N • m (2.2kgf • m)**

**Cylinder head bolt : 10 N • m (1.0kgf • m)**



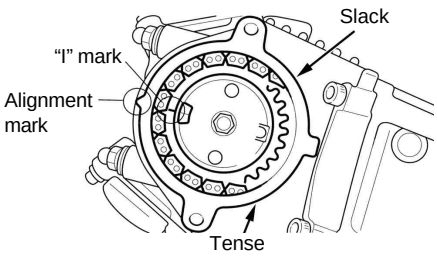

## ●Cam Sprocket Installation

◇Check that the "I" mark on the flywheel is still aligned with the **" △ "** mark on the crank case.




◇Install the cam sprocket to the cam chain, aligning the "I" mark on the cam sprocket with the " △ " mark on the cylinder head.

※ Fix the cam chain so the lower part of it (at the exhaust side) is stretched tight.




◇Aligning the notch on the cam shaft with the cam sprocket pawl, fix a breather plate and bolts. While holding the flywheel, tighten cam sprocket bolts.

**Specified torque : 30 N • m (3.0kgf • m)**

## ●Cam Chain Tensioner Installation

◇ Turn up a one-way pawl on the cam chain tensioner, and press a tensioner rod into it.

◇Install a provided gasket and cam-chain tensioner to the cylinder with two bolts.

**O** Install a ring, spring and cap bolt.

**Specified torque:**

**Tensioner mounting bolt**

**: 9 N • m (0.9kgf • m)**

**Cap bolt : 8 N • m (0.8kgf • m)**

◇ Rotate the crank shaft clockwise, and check that "I" mark on the cam sprocket is aligned with the alingment mark on the cylinder head when the "T" mark on the flywheel is aligned again with the "Γ" alignment mark on the crankcase cover.

◇ Attach a cover on the cam chain tensioner.

## ●Adjustment of valve clearance: (In the case of a cam being provided.)

◇ Insert a thickness gauge between the adjusting screw and valve stem to adjust the valve clearance. Holding the adjusting screw, tighten up the lock nut.

Valve clearance: 0.04 ～ 0.07 mm both for intake and exhaust.

**Specified torque : 7 N • m (0.7kgf • m)**

◇Install the cam sprocket cover and O-ring with two bolts.

**Specified torque : 7 N • m (0.7kgf • m)**

◇Install a tappet cover and O-ring for both intake and exhaust with three bolts each.

**Specified torque : 7 N • m (0.7kgf • m)**

## ●Spark Plug Installation

◇Install a spark plug.

**Specified torque : 13 N • m (1.3kgf • m)**

※ Be sure to replace the spark plug with the one with high thermal value of CR8E (NGK) or the higher one.

◇ Install and tighten the spark plug cap securely.

## ●Air Shroud Installation

◇ Put together the left and right side cylinder air shrouds, and fix them with tapping screws. Be careful not to jam a heat protector.

◇ Install a fan air shroud with a tapping screw and pan screw.

## ● Exhaust Pipe Installation

◇ Loosely tighten two nuts on the cylinder head side.

◇Temporarily fix the exhaust pipe onto the rear arm with a bolt & washer.

◇ Tighten all loosely-tightend nuts, bolts and washers to the specified torque.

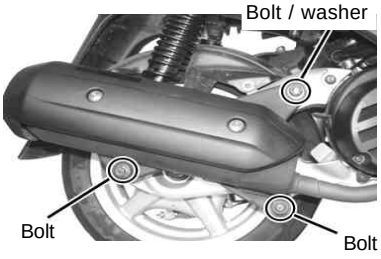
**Specified torque**

**Cylinder head nut : 13 N • m (1.3kgf • m)**

**Rear arm bolt : 31 N • m (3.1kgf • m)**

**Rear arm bolt / washer**

**: 53 N • m (5.3kgf • m)**




## ●Carburetor Installation

◇ Insert the carburetor into the manifold, and tighten a carburetor clamp to fix the carburetor.

## ● Parts Reinstallation

◇ With reference to YAMAHA genuine parts service manual, reinstall or connect all the removed parts.

## ● Engine Starting

### 1. About fuel

◇ High-octane gasoline should always be used.

◇ When regular gasoline is remaining in the fuel tank, always replace it with high-octane gasoline.

### 2. Final Checking

◇ Check every section for slacks in screws, nuts or the like.

◇Make sure that engine oil is remaining in a specified amount or more.

◇Drive the engine in a well-ventilated safe place with great care. Keep the engine idling for about 5 minutes so the engine oil gets circulated all around the engine.

◇Check that there is no abnormal noise from the engine or oil leak in every gasket.

◇Shut off the engine and wait for it to be cool. Then double check each section for slack in screws and nuts.

## ●About Shakedown

◇ We have designed the clearance between piston and cylinder narrow. So, refrain from sudden acceleration, and, in addition, never fail to carry out shakedown for about 100 km at reduced engine revolutions.


**SPECIAL PARTS TAKEGAWA**

3-5-16 Nishikiorihigashi Tondabayashi

Osaka Japan

TEL : 81-721-25-1357

FAX : 81-721-24-5059

URL : http://www.takegawa.co.jp